

Appendix A

Fujita Tornado Intensity Scale²

The Fujita Tornado Intensity Scale is a scale of wind damage intensity which wind *speeds* are inferred from an analysis of wind *damage*.

<u>Category</u>	<u>Definition and Effect</u>
F0	<u>Gale tornado (40-72 mph): Light damage.</u> Some damage to chimneys; break branches off trees; push over shallow-rooted trees; damage sign boards.
F1	<u>Moderate tornado (73-112 mph): Moderate damage.</u> The lower limit is the beginning of hurricane wind speed; peel surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads.
F2	<u>Significant tornado (113-157 mph): Considerable damage.</u> Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light-object missiles generated.
F3	<u>Severe tornado (158-206 mph): Severe damage.</u> Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off ground and thrown.
F4	<u>Devastating tornado (207-260 mph): Devastating damage.</u> Well-constructed houses leveled; structure with weak foundation blown off some distance; cars thrown and large missiles generated.
F5	<u>Incredible tornado (261-318 mph): Incredible damage.</u> Strong frame houses lifted off foundations and carried considerable distance to disintegrate; automobile-sized missiles fly through the air in excess of 100 yards; trees debarked; steel-reinforced structures badly damaged; incredible phenomena will occur.

² From *J. Atmos. Sci.*, August, 1981, p. 1517-1519

Appendix B

Event Statistics[#]

May 3-4, 1999

4 p.m.-3 a.m.

	NWSFO Norman CWA	NWSO Wichita CWA
# Tornadoes	57 *	3
# Tornado Warnings	70	7
Avg Lead Time for All Tornado Warnings	18 min	11 min
# Severe Thunderstorm Warnings	46	4
Fatalities	42	6
Injuries	795	150
Homes Destroyed	3,315	1,114
Homes Damaged	4,722	2,272
Schools Destroyed	2	2
Businesses Destroyed	164	72
Businesses Damaged	90	38
Damage Cost	\$1 billion	\$145 million

Most of the data in this table was provided by the May 14 *Daily Oklahoman*; Sedgwick County, Kansas, Emergency Management; American Red Cross; and the Oklahoma Department of Civil Emergency Management.

*** 65 tornadoes in all of Oklahoma during this event period.**

Appendix C

Oklahoma/Southern Kansas Tornado Outbreak of May 3, 1999

NWSFO Norman Chronological Product Highlights

Valid Time (CDT)	Product Issued or Severe Report	Area/Counties Affected	Remarks
1204 5/2/99	SWODY2	Most of Oklahoma	Slight risk of severe storms
0055 5/3/99	SWODY1	Most of Oklahoma	Slight risk of severe storms late this afternoon and tonight
0430	ZFP	NWSFO Norman CWA	Severe storms possible later today and/or tonight for most zones
0630	SPS	NWSFO Norman CWA	Slight risk of severe storms this afternoon and tonight; isolated tornadoes possible
1115	SWODY1	Most of Oklahoma	Part of the Slight risk area upgraded to Moderate risk
1230	SPS	NWSFO Norman CWA	Moderate risk of severe storms later this afternoon through tonight
1549	SWODY1	Western/Central Oklahoma	Part of the Moderate risk area upgraded to High risk
1523	SWOMCD	Western/Central Oklahoma	Increasing threat of supercells near the dryline late afternoon and evening
1600	ZFP	NWSFO Norman CWA	“Some thunderstorms may be severe” mentioned in most zones for tonight
1615-1700	SVR	Comanche Co.	First warning of the event issued

1620	HAIL	Lawton (in Comanche Co.)	First severe occurrence (1-inch diameter hail) of this event
1645	SEL5	Western/Central Oklahoma	Tornado Watch #195 issued; “tornadoes, hail to 3 inches, and wind gusts to 80 mph possible”
1647-1730	TOR	Comanche, Grady, and Caddo Counties	First tornado warning of the event issued
1651	TORNADO	7 miles east-northeast of Medicine Park (Comanche Co.)	Spotters report first tornado of this event (near I-44)
1713	SOFTBALL-SIZED HAIL	5 miles north of Altus (Jackson Co.)	Spotters report the first occurrence of very large hail of this event
1741	NOW	Oklahoma City Metro Area	Potential for tornadoes to move into the area that evening
1752	TORNADO	Grady Co.	First tornado in Grady County (4 miles south of Verden)
1830	NOW	NWSFO Norman CWA	Ongoing tornadic storms detailed for some counties; rest of area informed that “threat for tornadoes will continue to be high through the evening”
1840-1930	TOR	Cleveland and McClain Co.	First tornado warning that was issued for these counties
1858	TORNADO	McClain Co.	First tornado in McClain County (along Interstate 44 west of Newcastle)
1857	SVS	Oklahoma City Metro Area	Headlined, “...Tornado Emergency in South Oklahoma City Metro Area...” Predicts large damaging tornado will enter southwest metro area between 7:15-7:30 p.m. “Persons in Moore and south Oklahoma City should take immediate tornado precautions!”
1859	SEL8	Central Oklahoma	Tornado Watch #198 replaced #195; “particularly dangerous situation with destructive tornadoes possible”

1911	TORNADO	Cleveland Co.	First tornado in Cleveland County (crossed South Canadian River near SW 149 th Street)
1917-2000	TOR	Oklahoma Co.	First tornado warning that was issued for this county
1925	TORNADO	City of Moore	Tornado moved through Moore
1930	TORNADO	Oklahoma Co.	First tornado in Oklahoma County (entered southern part of county east of Interstate 35)
1931	SVS	Oklahoma City Metro Area	Headlined, "...Large Damaging Tornado Moving Through Oklahoma City Metro..." Also states, "Persons in southeast Oklahoma City and Midwest City are in danger!"
1934	TORNADO	Oklahoma Co.	Tornado near Tinker Air Force Base

NOTE: This table reflects only the highlights of the Oklahoma chronology. It lists some of the key statements, watches, warnings and severe reports but does *not* attempt to recreate all of the products that were issued and all the reports received during this extended tornado outbreak.

Appendix D

Oklahoma/Southern Kansas Tornado Outbreak of May 3, 1999

NWSO Wichita Chronological Product Log

Valid Time (CDT)	Product Type	Area/Counties Affected	Remarks
1204 5/2/99	SWODY2	Eastern Kansas	Slight risk of severe storms
0055 5/3/99	SWODY1	Eastern 2/3 Kansas	Slight risk of severe storms
1115	SWODY1	Southern Kansas	Upgraded to moderate risk
1218-0000	SPS	NWSO Wichita CWA	Highlighted threat of hail, damaging winds, and isolated tornadoes
1549	SWODY1	Southern Kansas	Upgraded to high risk
1612-1900	NOW	Sumner and Sedgwick Counties	Forecast rapid storm development between 1700-1900
1836-2100	NOW	Sumner, Sedgwick and Harper Counties	Forecast rapid storm development between 1900-2100
1917-2000	SVR	Harper Co.	18SW Anthony radar indicated hail up to 1 inch and winds over 55 mph
1921	SEL0	Central Kansas	Tornado Watch #200 1930-midnight
1938-2015	TOR	N Sumner Co.	Radar indicated strong rotation 2E of Mayfield
1944	SVS	N Sumner Co.	Tornado 1N of Mayfield
1949-2050	SVR	Sedgwick Co.	Hail near Haysville

2002	SVS	N Sumner Co.	Tornado 3NW of Wellington
2004	SVS	Sedgwick Co.	Hail in downtown Wichita
2016-2120	TOR	SE Sedgwick and N Sumner Counties	Tornado 4NW Wellington, strong rotation 2NE Wichita. Reissue for N Sumner 1 min after previous TOR expired
2016-2120	TOR	E Sedgwick and N Sumner Counties	Corrected warning to include all of east Sedgwick County
2023-2230	NOW	NWSO Wichita CWA	Forecast of continued development of severe storms with large hail, damaging winds, and isolated tornadoes possible
2029	SVS	Sedgwick Co.	Strong rotation near Kechi quarter sized hail near Andale
2033	SVS	E Sedgwick and N Sumner Counties	Tornado near Peck, possible tornado 7NW Wellington
2046	SVS	E Sedgwick Co.	Tornado entering S Wichita 1 st mention of Wichita being in path
2047-2150	SVR	W Sedgwick Co.	Warning re-issuance—radar indicated severe storm near Anness
2052	SVS	E Sedgwick Co.	Tornado moving through middle of Wichita
2059-2200	TOR	W Butler Co.	Radar indicated strong rotation near Andover
2107	SVS	W Sedgwick Co.	Radar indicated severe storm near Anness
2111	SVS	W Butler Co.	Radar indicated tornado near Rosehill
2116	SVS	E Sedgwick and N Sumner Counties	Allow warning to expire at 2120
2121	SVS	W Butler Co.	Tornado 1SW Augusta
2129-2215	SVR	Sumner Co.	Nickel sized hail near Perth

2130-2300	NOW	NWSO Wichita CWA	Severe storms to continue developing near and E of Anthony/Wichita/Marion
2132	SVS	W Sedgwick Co.	Warning canceled
2137-2225	TOR	Butler Co.	Radar indicated strong rotation 10NE and 8SW El Dorado
2145	SVS	Butler Co.	Tornado NE of El Dorado
2151	SVS	Sumner Co.	Radar indicated severe near Dalton and Oxford
2201	SVS	Butler Co.	Wall cloud N of El Dorado Lake
2209	SVS	Sumner Co.	Warning canceled
2211	SVS	Butler Co.	Warning canceled
2227	SPS	NWSO Wichita CWA	HWO indicating continued potential for storms overnight